REMARKS

The above amendments are submitted in response to the Office Action of October 10, 2000. No new subject matter has been added. Support for the new claims can be found in the originally filed claims as well as in the summary and the figures of the application. Reconsideration and allowance are kindly requested.

Claims 44-57 are now the only claims pending in this application. In view of the amendments, the rejection of claim 1 under 35 U.S.C. 102(e) is moot. It is submitted that the new claims are not anticipated by Peyman et al., U.S. Patent No. 4,633,866 (herein "Peyman").

The present invention is directed to optical fiber-based surgical systems suitable for use with a particular class of lasers operating in the mid-infrared region of approximately 2 micrometers in wavelength. These laser sources are generally known as "rare earth lasers." The present invention is based upon the discovery that such rare earth lasers can be coupled to low hydroxyl ion content silica fibers to deliver laser energy to a surgical site -- without excessive transmission losses.

More specifically, the invention is based, in part, on the discovery that the wavelengths of infrared radiation emitted by rare earth lasers are particularly well suited for surgery because such wavelengths in the range of 1.4 to 2.2 micrometers are strongly absorbed in biological tissue. The invention is also based on the discovery that low hydroxyl ion content silica fibers have both the flexibility and the high conductivity that enables the transmission of such wavelengths to remote surgical sites to facilitate removal or repair of biological tissue. When operated in a pulsed mode the systems of the present invention can deliver sufficient energy to remove tissue; and when operated in a low power continuous wave mode repair of biological tissue can be achieved.

The Peyman *et al.* patent discloses an ophthalmic laser surgical method for treating the anterior portions of an eye while avoiding damage to the fundus and retina, an accomplishment under Peyman *et al.* completed by aiming or focusing radiation onto the cornea, lens or extracapular membranes. The experiments and examples by Peyman *et al.* all employ the transmission of laser energy through the air into a slit focusing lens, not through a transmissive optical fiber.

Peyman *et al.* suggest in passing, that an optic fiber may be employed with their devices. But the cited patent fails to demonstrate any appreciation of the problem of high losses in conventional silica fibers in the desired wavelength range, as such transmission method is absent in all experiments and examples within the reference. Peyman *et al.* used either a Zeiss slit lamp or +20 diopter lens to focus the beam, never an optical fiber. Moreover, Peyman *et al.* were concerned only with the laser energy aimed or focused directly on the eye. There is no suggestion of transmitting laser energy to remote surgical sites that may be one or more meters away from the energy generating source, as is typically the case in laser catheter instruments.

Because Peyman *et al.* did not appreciate the problem, they can not be read to suggest the solution disclosed by Applicant. More correctly, had Peyman *et al.* tried to construct a fiber optic instrument, they would have encountered the problem clearly identified by the Applicant in the background description of this application, namely conventional fibers exhibit unacceptably high losses.

The new claims presented above clearly define Applicant's solution to this problem and contribution to the art, for which patent protection is earnestly requested.

Thus, for all the reasons above, it is believed that the presently pending claims are both patentably distinct from the prior art and entitled to patent protection. Reconsideration and allowance are kindly requested.

Respectfully submitted,

NUTTER, McCLENNEN & FISH, LLP

Date: April 10, 2001

Thomas J. Engellenner
Reg. No. 28,711
Attorney/Agent for Applicant(s)

One International Place
Boston, MA 02110-2699
Tel: (617)439-2948
Fax: (617)310-9948
978486.1

APPENDIX A

Marked-Up Claim Revisions

44. (New) A surgical system comprising:

a hollow elongate instrument, having at least one lumen suitable for receiving an optical fiber, and being maneuverable to provide a conduit for transmission of laser energy to a surgical site; and

a flexible, elongate fiber for conducting laser energy from a proximal end of said fiber to a surgical site at a distal end of said fiber, the proximal end suitable for receiving laser energy, and said fiber being a silica fiber having a low hydroxyl ion content to reduce absorption of laser energy at a wavelength of about 1.4-2.2 micrometers.

45. (New) The system of claim 44, wherein said fiber is suitable for coupling with and conducting energy of a Holmium-doped Yttrium-Aluminum-Garnet laser.

46. (New) The system of claim 44, wherein said fiber is suitable for coupling with and conducting energy of a Erbium-doped Yttrium-Aluminum-Garnet laser.

47. (New) The system of claim 44, wherein said fiber is suitable for coupling with conducting energy from a Thulium-doped Yttrium-Aluminum-Garnet laser.

48. (New) The system of claim 44, wherein said fiber is suitable for coupling with and conducting energy from a Holmium-doped Yttrium-Lithium-Fluoride laser.

49. (New) The system of claim 44, wherein said fiber is suitable for coupling with and conducting energy from a Erbium-doped Yttrium-Lithium-Fluoride laser.

50. (New) The system of claim 44, wherein the said fiber is suitable for conducting pulsed laser energy.

51. (New) The system of claim 44, wherein the said fiber is suitable for conducting pulsed wave laser energy sufficient to remove biological tissue by vaporization.

52. (New) The system of claim 44, wherein said fiber is suitable for conducting laser energy with a pulse width of 0.2-5 milliseconds.

53. (New) The system of claim 44, wherein said fiber is suitable for conducting pulsed laser energy at a repetition rate of about 1 to about 10 pulses per second.

54. (New) The system of claim 44, wherein said fiber is suitable for delivery of energy to a surgical site of at least 0.57 millijoules per pulse.

55. (New) The system of claim 44 wherein the fiber is suitable for conducting continuous wave radiation.

56. (New) The system of claim 55 wherein the fiber to photocoagulate tissue.

57. (New) The system of claim 44 wherein the hollow elongate instrument is a catheter.